

Original Article

Stapled Haemorrhoidectomy: Bothersome Staple Line Bleeding

Dean C.S. Koh, Denis M.O. Cheong and Kutt Sing Wong, Department of General Surgery, Tan Tock Seng Hospital, Singapore.

BACKGROUND: The stapled haemorrhoidectomy procedure has been popularized as a painless and effective treatment for prolapsing haemorrhoidal disease. We have noted that staple line bleeding is a contributory factor to postoperative morbidity.

METHODS: This was a retrospective analysis of the clinical records of consecutive stapled haemorrhoidectomy procedures performed in patients over a 1-year period. The outpatient, operative and inpatient records were reviewed. We assessed the incidence of intraoperative staple line bleeding, its management and early postoperative outcomes in our patients undergoing stapled haemorrhoidectomy.

RESULTS: From March 2000 to March 2001, 39 stapled haemorrhoidectomy procedures were performed. Intraoperative staple line bleeding was recorded in 17 patients (44%) and suture reinforcement of this staple line was required in 12 (31%). Nine patients (23%) were admitted for postoperative per rectal bleeding, four of whom required surgical haemostasis of bleeding points along the staple line. Delayed secondary haemorrhage was seen in one patient. The incidence of postoperative bleeding in patients with noted staple line bleeding was 35%, compared with 14% in those without evidence of bleeding.

CONCLUSION: Staple line bleeding is a technical difficulty and complication associated with stapled haemorrhoidectomy. It should be managed with meticulous haemostatic suture placement in order to avoid postoperative bleeding and the morbidity of re-operation for haemostasis. [*Asian J Surg* 2005;28(3):193–7]

Key Words: haemorrhoid, haemorrhoidectomy, staple line bleeding

Introduction

The stapled haemorrhoidectomy procedure as described by Longo¹ has been popularized as a painless and effective treatment for prolapsed haemorrhoidal disease. Randomized studies have shown superior postoperative pain control and earlier return to normal activity compared with conventional open surgery.^{2–6}

Various authors have reported multiple complications, including persistent anorectal pain, faecal urgency, stricture formation, recurrent prolapses, pelvic sepsis, rectal perforations and bleeding.^{7–15} We have sought to describe our

early experience with perioperative bleeding encountered during the first year of our use of this technique. The objective of our study was to determine the incidence of both intraoperative and postoperative bleeding as a complication in patients treated using the Longo stapled haemorrhoidectomy procedure. The outcome of our haemostatic measures was also determined.

Patients and methods

This was a retrospective analysis of the clinical records of consecutive stapled haemorrhoidectomy procedures per-

Address correspondence and reprint requests to Dr. Dean C.S. Koh, Colorectal Unit, Department of General Surgery, Tan Tock Seng Hospital, 11 Jalan Tan Tock Seng, Singapore 308433.
E-mail: Dean_Koh@ttsh.com.sg • Date of acceptance: 23 June 2004

formed over a 1-year period in the Department of General Surgery. The outpatient, operative and inpatient records were reviewed.

Patients were offered stapled haemorrhoidectomy if they fulfilled the following criteria: third-degree haemorrhoids (prolapsing haemorrhoids with anal skin involvement) unsuitable for ligation or symptomatic second-degree haemorrhoids that recurred following banding with no concomitant anal pathology requiring other surgical procedures.

All procedures were performed by a single trained colorectal surgeon (DMOC) according to the technique described by Longo.¹ The Ethicon HCS 33 circular stapler (Ethicon Endo-Surgery, Cincinnati, OH, USA) was used and all patients received either general or regional anaesthesia. A standard lithotomy position was adopted for insertion of the anoscope and placement of the purse-string suture. The rectal purse-string suture was placed 4 cm proximal to the dentate line to ensure that the staple line would lie just above the internal anal sphincter. The stapler was fired and kept closed for a minimum of half a minute to minimize staple line bleeding.

Upon removal of the stapler, an anoscope was introduced and the staple line was carefully inspected. Active bleeding along the staple line was managed by under-running these points with 3/0 vicryl sutures. A haemostatic sponge dressing (Spongiosan Anal, Ethicon Endo-Surgery) was placed in the anal canal at the end of the procedure.

Patients were monitored in the recovery room for 4 hours before review by the anaesthetist. They were discharged when deemed fit. Inpatients were reviewed in the ward prior to discharge.

Results

A total of 40 patients were accrued over a 1-year period spanning March 2000 to March 2001. There were 23 males and 17 females, with a median age of 47 years (range, 29–80 years).

The predominant presenting symptom was bleeding per rectum (85%, $n = 34$). This was followed in descending order by prolapse, pain, constipation, pruritus and per-rectal discharge. The duration of these symptoms ranged from 3 weeks to 30 years. Most patients (37, 93%) had third-degree haemorrhoids. Twenty-six patients (65%) were admitted as day cases, with the intention to discharge them on the day of surgery. However, nine (23%) were eventually admitted to hospital by the surgeon for observation.

The average duration of the procedure was 30 minutes (range, 20–50 minutes). Prophylactic antibiotics were not rou-

tinely administered. Only two patients received intraoperative antibiotics, which were prescribed after reports on the incidence of pelvic sepsis following the procedure were published.¹⁵ One patient went on to have a standard Milligan-Morgan haemorrhoidectomy when he developed thrombosed fourth-degree haemorrhoidal disease after the stapling. This patient was excluded from the subsequent analysis.

Most procedures (56%) were completed uneventfully. Intraoperative staple line bleeding was documented in 17 patients (44%). Bleeding stopped spontaneously in five of these. Twelve patients (31%) required placement of sutures along the staple line to secure haemostasis (Figure 1).

During the immediate postoperative period, nine patients (23%) developed overt per rectal bleeding while in the recovery room. Review of their operative notes showed that of these, four had significant intraoperative staple line bleeding necessitating suture haemostasis, two did not require any haemostatic suture placement, and three did not have any bleeding intraoperatively. Blood transfusion was required in one patient. Four patients were eventually brought back to the operating room for surgical haemostasis (Figure 2). Of these, two had developed active bleeding while in the recovery room. The other two developed per rectal bleeding while in the ward. Examination of all four patients under anaesthesia showed that bleeding originated from the staple line. This was controlled by further placement of haemostatic sutures.

Following discharge, one of the nine patients described above was readmitted after developing profuse per rectal bleeding on the sixth postoperative day. Examination in the operating room under anaesthesia revealed secondary haemorrhage from the staple line and the rectal mucosa overlying the haemorrhoid. Review of this patient's records showed that there had been staple line bleeding requiring suture haemostasis as well as immediate postoperative bleeding per rectum that stopped spontaneously while in the recovery room.

- Staple line bleeding not requiring suture haemostasis ($n = 5$)
- Staple line bleeding requiring suture haemostasis ($n = 12$)
- No staple line bleeding ($n = 22$)

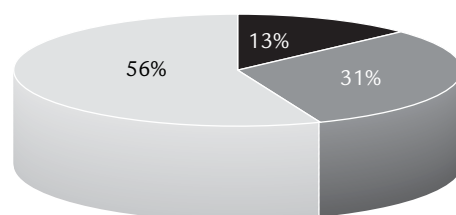


Figure 1. Incidence of intraoperative staple line bleeding.

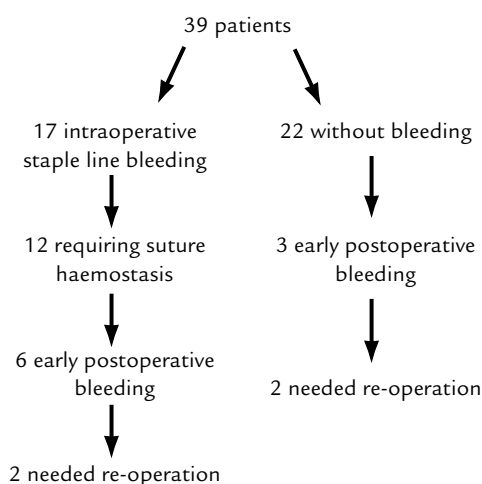


Figure 2. Schematic summary of outcome of patients undergoing stapled haemorrhoidectomy.

Discussion

The incidence of bleeding following the stapling procedure has been described in some series. However, there has not been any detailed evaluation of the incidence of staple line bleeding and its relationship to postoperative haemorrhage.

Our experience of intraoperative staple line bleeding in 44% of our patients is not uncommon. This can be attributed to several factors. Circular staplers were designed to establish anastomosis between two ends of the bowel. In bowel anastomosis, it is customary to denude the bowel edges of the mesentery prior to firing the stapler, to minimize bleeding into the staple line. Unfortunately, when the stapler is deployed in an intact bowel lumen in the Longo technique, the stapler actually cuts across well vascularized tissue, including submucosal blood vessels, under relatively high pressure. The rectal wall is notoriously vascular, with vessels situated just beneath the mucosa. Most of the bleeding seen in our patients was active arterial spurting, which required under-running with a suture. We believe that this problem requires a modification of stapler design and configuration so that the stapler, when fired, would result in greater compression of the submucosal vessels and a more haemostatic procedure.

Staple size may also contribute to the problem of bleeding and postoperative pain. We found the 33-mm diameter of the standard stapler too large for many of our Asian patients. Insertion of a large stapler required anal dilatation in selected patients, which may result in mucosal tears, contributing to bleeding and postoperative pain. This problem may easily be circumvented by offering staplers in different sizes.

The problem of intraoperative staple line bleeding has been noted by other authors.^{2,5,7,13,16-18} It is recommended practice that all these bleeding spots be addressed before completion of the procedure. The placement of figure-of-eight haemostatic non-absorbable sutures is a widely accepted method. An alternative method is the application of short bursts of electrocautery to the bleeding points. However, there have been concerns that this may compromise the integrity of the staple line and potentially lead to dire consequences. Of our 17 patients with intraoperative staple-line bleeding, 12 (70%) required haemostatic suture placement. On analysis of these 12 patients, it was noted that four went on to develop postoperative bleeding and one had to be brought back to the operating theatre for surgical haemostasis. The patient who developed delayed secondary haemorrhage on the sixth postoperative day also had staple line bleeding. Review of the literature has shown that the incidence of postoperative bleeding varies from 0.01% to 25%.^{2,5,7,13,16-18} Our incidence of 23% (9 of 39), although within the reported limits, is significantly higher than that reported with the standard open method, which varies from 3.3% to 6.7%.¹⁹ We attribute this to several reasons. First, as this series represented our early experience, the exact placement of the purse-string suture may have been too low in some instances, resulting in the staple firing across more haemorrhoidal tissue than intended. Second, it was felt that small oozing spots would be adequately managed with the haemostatic sponge and, hence, these were not managed in the same manner as arterial spurters. Third, upon removal of the dilator at the end of the procedure, bleeding points from the remaining haemorrhoidal tissue or mucosal tears may not have been addressed adequately prior to transferring the patient out of the operating theatre.

Despite good haemostasis secured intraoperatively, we noted a significant incidence of delayed bleeding in the immediate postoperative period, contributing to unplanned hospitalization and even further surgical procedures. Four of 12 patients (33%) who had minor intervention (suture placement) for staple line bleeding went on to develop significant postoperative bleeding. The incidence of this in patients without documented staple line bleeding was 14% (3 of 22) as opposed to 35% (6 of 17) in those with bleeding from the staple line documented intraoperatively. This difference was not, however, significant (Fisher's exact test, $p = 0.14$). Nevertheless, the presence of significant intraoperative staple line bleeding may be a predictor of further bleeding postoperatively. Finding arterial spurters during re-operation suggests that these were possibly not appropriately addressed in the first operation.

Alternatively, the presence of postoperative infection may have been a contributory factor, as is the case in the open procedure.

It is, therefore, imperative that meticulous haemostasis be achieved at the end of the procedure, after removal of the dilator. The presence of any form of bleeding must be addressed with suture placement for haemostasis. We believe that this is an effective and necessary step in the procedure and will obviate the need to admit the patient for postoperative monitoring, as was the case in 23% of our patients. This will ensure that the stapled haemorrhoidectomy procedure remains a safe ambulatory procedure, no different from the open method.

Several established practice tips have been described to reduce the incidence of staple line bleeding. The placement of the purse-string suture is of paramount importance. This requires experience not only in its position relative to the dentate line, but also the depth of penetration of the suture needle. Suture placement too close to the dentate line tends to result in more bleeding as the point of transection lies across the haemorrhoidal tissues. Placement too high, on the other hand, will tend to result in inadequate retraction of the prolapse.

In the randomized trial by Ho,²⁰ use of the circular anal dilator prior to introduction of the stapler was associated with an increased risk of anal sphincter injuries. Ho suggested the alternative of an Eisenhammer retractor to facilitate the insertion of the stapler device, and postulated that this may avoid excessive stretching of the anal sphincters. Some surgeons have reported that the use of this retractor to place the purse-string suture is less traumatic to the mucosa and results in less bleeding, although this has not been validated in any trial so far.

The Lone Star retractor has been used to provide better effacement of the anus and more accurate, controlled placement of the purse-string suture and subsequent introduction of the stapling device.²¹ Whether or not this reduces the incidence of bleeding remains to be evaluated.

For patients who develop post-stapler haemorrhoidectomy bleeding, surgical intervention in the form of haemostatic suture placement or diathermy coagulation remains the most effective technique for haemostasis. Nonsurgical measures such as adrenaline injection have been used, as in post-open haemorrhoidectomy bleeding. Balloon tamponade is another technique advocated for suture line bleeding. In the series reported by Gabrielli et al, persistent bleeding despite the placement of a haemostatic stitch was managed using a double balloon Imbert's probe.¹⁶ This was inflated

for 4 hours. They found this method to be safe and effective, arresting haemorrhage and avoiding unnecessary surgical exploration.

Conclusion

The main technical difficulty and complication associated with stapled haemorrhoidectomy in our patients was that of staple line bleeding. Meticulous haemostasis with accurate figure-of-eight or running suture placement over the bleeding points under clear direct vision is essential to reduce the morbidity of postoperative haemorrhage. Adjuncts such as diathermy coagulation, use of Lone Star retractors and catheter balloon occlusion require further evaluation. Stapler design modifications should be sought in order to minimize this problem.

References

1. Longo A. Treatment of haemorrhoidal disease by reduction of mucosa and haemorrhoidal prolapse with a circular suturing device: a new procedure. In: *Proceedings of the 6th World Congress of Endoscopic Surgery*, Rome, 3–6 June, 1998:777–84.
2. Mehigan BJ, Monson JRT, Hartley JE. Stapling procedure for haemorrhoids versus Milligan Morgan haemorrhoidectomy: a controlled trial. *Lancet* 2000;355:782–5.
3. Rowsell M, Bello M, Hemingway DM. Circumferential mucosectomy (stapled haemorrhoidectomy) versus conventional haemorrhoidectomy: randomized controlled trial. *Lancet* 2000;355:779–81.
4. Ganio E, Altomare DF, Gabrielli F, et al. Prospective randomized multicentre trial comparing stapled with open haemorrhoidectomy. *Br J Surg* 2001;88:669–74.
5. Ho YH, Cheong WK, Tsang C, et al. Stapled haemorrhoidectomy – cost and effectiveness. Randomized, controlled trial including incontinence scoring, anal manometry, and endoanal ultrasound assessments at up to 3 months. *Dis Colon Rectum* 2000;43:1666–75.
6. Shalaby R, Desoky A. Randomized clinical trial of stapled versus Milligan Morgan haemorrhoidectomy. *Br J Surg* 2001;88:1049–53.
7. Cheetham MJ, Mortensen NJ, Nystrom PO, et al. Persistent pain and faecal urgency after stapled haemorrhoidectomy. *Lancet* 2000;356:730–3.
8. Keighley MR. Pain after stapled haemorrhoidectomy. *Lancet* 2000;356:2189.
9. Beattie GC, Loudon MA. Pain after stapled haemorrhoidectomy. *Lancet* 2000;356:2189.
10. Longo A. Pain after stapled haemorrhoidectomy. *Lancet* 2000;356:2189.
11. Rowsell M, Bello M, Hemingway DM. Pain after stapled haemorrhoidectomy. *Lancet* 2000;356:2189.
12. Pescatori M. Pain after stapled haemorrhoidectomy. *Lancet* 2000;356:2189.
13. Herold A, Kirsch JJ. Pain after stapled haemorrhoidectomy. *Lancet* 2000;356:2189.

14. Jongen JH, Bock JU. Pain after stapled haemorrhoidectomy. *Lancet* 2000;356:2189.
15. Molloy RG, Kingsmore D. Life threatening pelvic sepsis after stapled haemorrhoidectomy. *Lancet* 2000;355:810.
16. Gabrielli F, Chiarelli M, Cioff U, et al. Day surgery for mucosal-haemorrhoidal prolapse using a circular stapler and modified regional anaesthesia. *Dis Colon Rectum* 2001;44:842-4.
17. Luigi MP, Bartalucci B, Bencini L, et al. Early and late (ten years) experience with circular stapler haemorrhoidectomy. *Dis Colon Rectum* 2001;44:836-41.
18. Seow-Chuen F. Stapled haemorrhoidectomy: pain or gain. *Br J Surg* 2001;88:1-3.
19. Khalil KH, O'Bichere A, Sellu D. Randomized clinical trial of sutured versus stapled closed haemorrhoidectomy. *Br J Surg* 2000;87:1352-5.
20. Ho YH. Stapled haemorrhoidectomy – the evidence for and the facts against. *Ann Acad Med Singapore* 2001;30:1-2.
21. Carreiro A, Dal Borgo P, Pucciani F. Stapled mucosal prolapsectomy for haemorrhoidal prolapse with Lone Star Retractor System. *Tech Coloproctol* 2001;5:41-6.